

What is claimed is:

1. A polarity exchanger, comprising:

a stripping canal for passing an ion beam therethrough;

a gas supply unit connected to the stripping canal for providing a stripping gas into the stripping canal to change a polarity of the ion beam while the ion beam passes through stripping canal;

a gas circulation unit connecting the stripping canal to the gas supply unit to circulate the stripping gas;

a flow meter for measuring a flow rate of the stripping gas provided into the stripping canal;

an ammeter for measuring a driving current applied to the gas circulation unit for operating the gas circulation unit; and

a monitoring unit for generating a control signal to control a process for changing the polarity of the ion beam in accordance with a measured flow rate of the stripping gas and a measured driving current.

2. The polarity exchanger as claimed in claim 1, wherein the gas supply unit comprises:

a gas source for storing the stripping gas;

a gas supply pipe connecting the stripping canal to the gas source;

a flow control valve installed in the gas supply pipe for controlling the flow rate of the stripping gas provided into the stripping canal; and

a driving member coupled to the flow control valve for opening and closing the flow control valve in accordance with the control signal.

3. The polarity exchanger as claimed in claim 1, wherein the gas circulation unit comprises:

a gas circulation pipe connecting the stripping canal to the gas supply unit; and

a vacuum pump installed in the gas circulation pipe for circulating the stripping gas provided into the stripping canal through the gas circulation pipe.

4. The polarity exchanger as claimed in claim 3, further comprising:

a generator coupled to the vacuum pump for applying the driving current to the vacuum pump;

a motor for providing rotary power to the generator;

a rotary shaft connecting the generator and the motor; and

a power supply for applying power to the motor in accordance with the control signal.

5. The polarity exchanger as claimed in claim 4, wherein the ammeter is connected to a power line connecting the vacuum pump and the generator.

6. The polarity exchanger as claimed in claim 1, wherein the monitoring unit comprises:

a first comparator for comparing the measured flow rate of the stripping gas with a previously set reference flow rate in order to generate a first comparative signal;

a second comparator for comparing the measured driving current with a previously set reference current in order to generate a second comparative signal; and

a controller for generating the control signal in accordance with the first comparative signal and the second comparative signal.

7. The polarity exchanger as claimed in claim 1, further comprising:

an alarm unit for generating an alarm signal in accordance with the control signal.

8. The polarity exchanger as claimed in claim 1, further comprising:

a lifting gate for blocking the ion beam; and

a driving member for driving the lifting gate in accordance with the control signal.

9. The polarity exchanger as claimed in claim 1, further comprising:

a display unit for displaying the measured flow rate of the stripping gas and the measured driving current.

10. The polarity exchanger as claimed in claim 1, wherein the stripping gas includes a nitrogen gas or an argon gas.

11. An ion implanter, comprising:

- an ion source for providing an ion beam;
- an accelerator for accelerating the ion beam;
- a polarity exchanger for changing a polarity of the ion beam while the ion beam passes through the accelerator;
- an ion implantation chamber for performing an ion implantation process on a substrate using the ion beam having a changed polarity; and
- a support unit installed in the ion implantation chamber for supporting the substrate,

wherein the polarity exchanger includes:

- a stripping canal installed in the accelerator for passing the ion beam therethrough;
- a gas supply unit coupled to the stripping canal for providing a stripping gas into the stripping canal to change the polarity of the ion beam while the ion beam passes through the stripping canal;
- a gas circulation unit connecting the stripping canal to the gas supply unit for circulating the stripping gas;
- a flow meter for measuring a flow rate of the stripping gas provided into the stripping canal;
- an ammeter for measuring a driving current applied to the gas circulation unit to operate the gas circulation unit; and

a monitoring unit for generating a control signal to control a process for changing the polarity of the ion beam in accordance with a measured flow rate of the stripping gas and a measured driving current.

12. The ion implanter as claimed in claim 11, wherein the ion beam provided from the ion source has a negative polarity.

13. The ion implanter as claimed in claim 12, wherein the accelerator comprises:

a plurality of first electrodes connected in series wherein a first voltage is applied to the first electrodes to accelerate the negative ion beam; and

a plurality of second electrodes connected in series wherein a second voltage is applied to the second electrodes to accelerate a positive ion beam generated from the negative ion beam having a polarity changed by the polarity exchanger.

14. The ion implanter as claimed in claim 13, further comprising:
a power source for applying the first and second voltages to the accelerator to accelerate the negative ion beam and the positive ion beam, respectively, in accordance with the control signal.

15. The ion implanter as claimed in claim 11, further comprising:
a lift gate for blocking the ion beam provided into the accelerator; and

a driving member for operating the lift gate in accordance with the control signal.

16. The ion implanter as claimed in claim 11, wherein the gas supply unit comprises:

- a gas source for storing the stripping gas;
- a gas supply pipe connecting the stripping canal to the gas source;
- a flow control valve installed in the gas supply pipe for controlling the flow rate of the stripping gas provided into the stripping canal; and
- a driving member coupled to the flow control valve for opening and closing the flow control valve in accordance with the control signal.

17. The ion implanter as claimed in claim 11, wherein the gas circulation unit comprises:

- a gas circulation pipe connecting the stripping canal to the gas supply unit; and
- a vacuum pump installed in the gas circulation pipe for circulating the stripping gas provided into the stripping canal through the gas circulation pipe.

18. The ion implanter as claimed in claim 17, further comprising:

- a generator coupled to the vacuum pump for applying the driving current to the vacuum pump;
- a motor for providing rotary power to the generator;

a rotary shaft connecting the generator to the motor; and
a power supply for applying power to the motor in accordance with the control signal.

19. The ion implanter as claimed in claim 11, wherein the monitoring unit comprises:

a first comparator for comparing the measured flow rate of the stripping gas with a previously set reference flow rate to generate a first comparative signal;

a second comparator for comparing the measured driving current with a previously set reference current to generate a second comparative signal;
and

a controller for generating the control signal in accordance with the first comparative signal and the second comparative signal.